DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 592—I

THE CHISANA PLACER DISTRICT ALASKA

BY

ALFRED H. BROOKS

Mineral Resources of Alaska, 1913—I

WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

Monograph

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THE CHISANA PLACER DISTRICT.

By Alfred H. Brooks.

INTRODUCTION.

The Chisana placer district, also called the Shushana district, comprises an ill-defined area lying in the headwater region of Chisana River (sometimes known as the Shushana), which joins with the Nabesna to form the Tanana, which in turn flows into the Yukon. The discovery of gold placers in this district in 1913 made it the focal point of interest to miners and prospectors and resulted in a large influx of people from all parts of Alaska, as well as from outside of the Territory. This region has not been visited by any member of the Survey since the finding of the placer gold. Its geology and topography are, however, fairly well known through previous surveys, and much data on the occurrence of the alluvial gold have been obtained from several reliable sources.

While exploring White and Tanana rivers in 1898 W. J. Peters and the writer passed about 40 miles north of the locality at which gold was discovered,[1] and the following year extended this work by an exploration [2] which traversed the headwaters of the Chisana. At about the same time Rohn [3] reached this region by crossing the Wrangell Mountains from the south. More accurate surveys were made in the same field in 1902 [4] by F. C. Schrader and W. C. Mendenhall. The most comprehensive report on this province is that by Moffit, Knopf, and Capps,[5] who in 1908 extended the geologic and topographic mapping of this area.

Since the discovery of placer gold the district has also been visited by D. D. Cairnes, of the Geological Survey of Canada. Mr. Cairnes has kindly furnished the writer both with cartographic data and with an advance copy of a paper [6] containing the results of this

[1] Brooks, A. H., A reconnaissance in the White and Tanana river basins, Alaska, in 1898: U. S. Geol. Survey Twentieth Ann. Rept., pt. 7, pp. 425–494, 1900.

[2] Brooks, A. H., A reconnaissance from Pyramid Harbor to Eagle City, Alaska: U. S. Geol. Survey Twenty-first Ann. Rept., pt. 2, pp. 331–391, 1900.

[3] Rohn, Oscar, A reconnaissance of the Chitina River and the Skolai Mountains: U. S. Geol. Survey Twenty-first Ann. Rept., pt. 2, pp. 393–440, 1900.

[4] Mendenhall, W. C., and Schrader, F. C., The mineral resources of the Mount Wrangell district, Alaska: U. S. Geol. Survey Prof. Paper 15, 1903.

[5] Moffit, F. H., and Knopf, Adolph, Mineral resources of the Nabesna-White River district, Alaska, with a section on the Quaternary by S. R. Capps: U. S. Geol. Survey Bull. 417, 1910.

[6] Cairnes, D. D., Chisana gold fields: Canadian Min. Inst. Bull. 24, 1914.

examination. The writer is also fortunate in having the use of notes made by A. C. Baldwin, engineer of the International Boundary Commission, who passed through the Chisana district in the fall of 1913, as well as those of A. Neustaedter, a mining engineer, who also recently visited this field. Much information is therefore available concerning the region in which the discovery was made, and it will be summarized here for the use of the prospector. The writer's own field work of many years ago, of course, furnished only a small part of the data here presented.

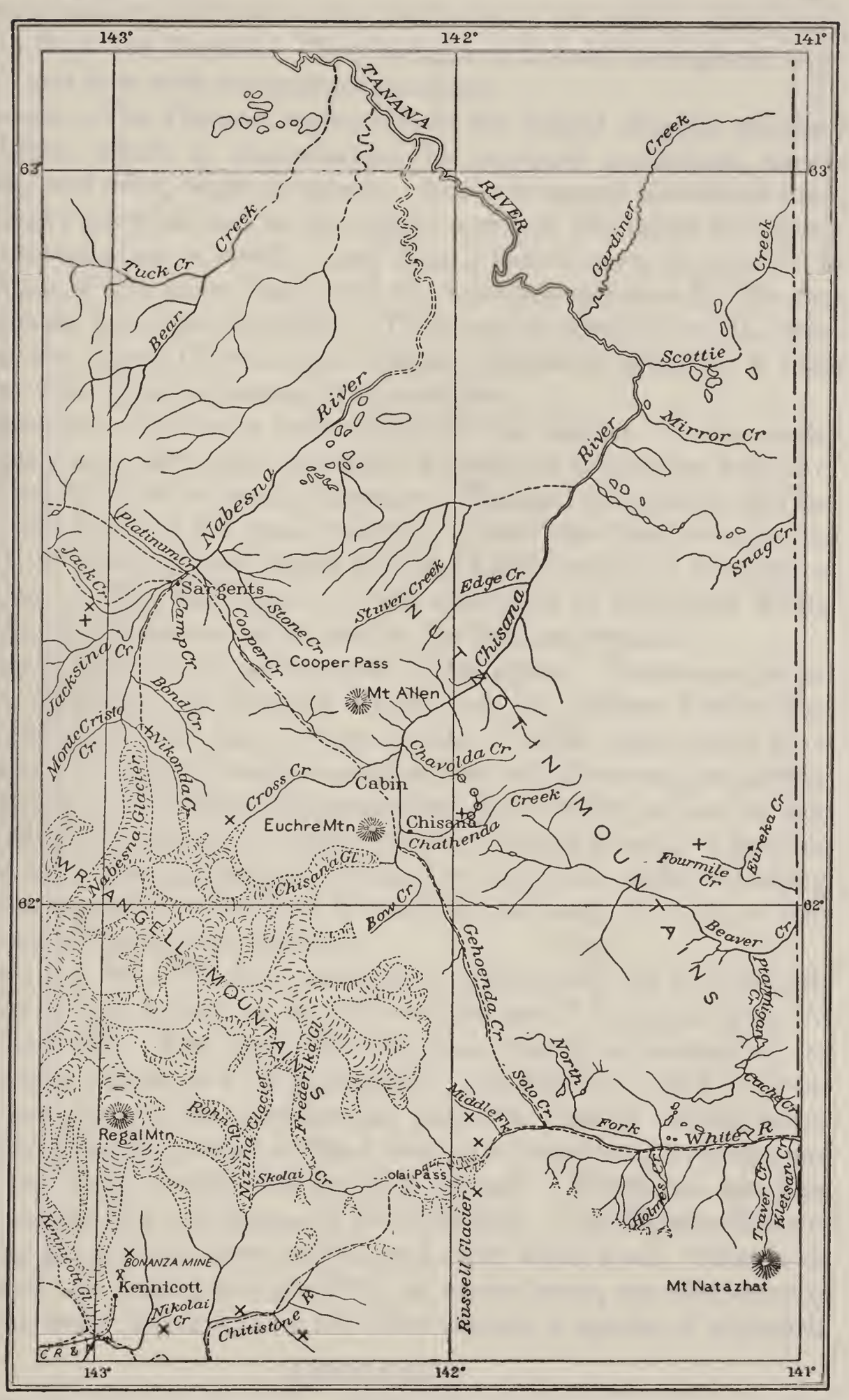
GEOGRAPHY.

Topography.—The site of the placer-gold discovery is centrally located in the quadrangle roughly blocked out by the international boundary on the east, meridian 143° and parallels 61° 30′ and 63°. (See Pl. XIII.) Its southwestern part is occupied by the snow and ice clad Wrangell Mountains, whose highest peaks are over 16,000 feet above sea level. On the north the Wrangell Mountains fall off abruptly to a belt of lesser relief that stretches from White River on the southeast to the head of Copper River on the northwest. Northeast of this depression are the Nutzotin Mountains, a rugged highland area about 20 miles in width, whose peaks stand from 5,000 to 10,000 feet above sea level. These mountains fall off on the northeast to the upper Tanana lowland, a gravel-floored plain about 20 miles in width and about 3,000 feet above sea level. This is bounded on the north by the rolling upland of the Yukon-Tanana region.

To recapitulate, there are in this region five topographic provinces, namely, the Wrangell and Nutzotin mountains, a zone of lesser relief separating the two, the Tanana lowland, and the Yukon-Tanana upland.

Drainage.—The drainage of the region is carried north and east to the Yukon by three large rivers—the White, the Chisana, and the Nabesna. The first springs from Russell Glacier, occupying Skolai Pass, and maintains an easterly direction for some 30 miles, flowing through a broad gravel-filled valley with gentle slope. Near the international boundary it enters a steep-walled valley, from which it emerges 15 miles below, and thence to the Yukon occupies a broad valley.

The Chisana and Nabesna valleys are of the same topographic type. Both rise in glaciers on the northeast flank of Wrangell Mountains. Just below their glacial sources they receive numerous tributaries whose broad valleys form a part of the depression between the Wrangell and Nutzotin mountains. Leaving these basins they enter the Nutzotin Mountains, which they traverse through narrow steep-walled valleys about 20 miles in length and then debouch on the Tanana lowland. These rivers maintain a northwesterly



20 10 0 20 Miles

× Copper + Lode gold ⊙ Placer gold ---------- Trail

SKETCH MAP SHOWING MINERAL DEPOSITS OF THE NABESNA, CHISANA, AND WHITE RIVER BASINS.

course across this lowland to the north rim of the valley, where they join to form the Tanana. They are gravel floored throughout their length and flow with tempestuous current.

Climate.—The Chisana region lies in the inland climatic province of Alaska, which is characterized by semiarid conditions, severe winters, and mild, bright summers. In the Wrangell Mountains there is a heavy snowfall, but in the region north of this range the aggregate precipitation is small. Less than 2 feet of snow is reported in the upper White River basin, and the total precipitation for the year is probably less than 10 inches. There are no records, but the rainfall in the upper Chisana and Nabesna basins is probably a little greater than in other parts of the province.

Vegetation.—Timber is rather scant in the district. In the valley bottoms spruce and other varieties of trees are found, the largest of which are 18 to 20 inches in diameter. Timber line is 300 to 500 feet above the floors of the main valleys. Above this there is a stunted growth of willow, which locally is found 1,000 feet above the limit of the spruce. The best timber of the district is in the upper White, Chisana, and Nabesna basins and in the Tanana lowland.

Grass is abundant in many parts of the region. The bars of upper White, Chisana, and Nabesna rivers and the Tanana lowland are especially noted for their forage plants. Unlike most other parts of Alaska, this region furnishes some winter as well as summer pasture. Owing to the dry climate the grass cures on the stalk, and as the light snowfall blows away in favored localities, winter grazing is possible. Horses have been frequently wintered in the region without feeding. It is not known how much of this winter pasturage there is, as only local patches have been utilized.

Game and fish.—While some forms of agriculture are undoubtedly possible in this region, so far the only source of food has been the game and fish. The large game includes sheep, abundant in the mountains; moose, not very plentiful; and caribou, which in some years are present in considerable numbers. Large brown bears, probably grizzlies, as well as black bears are found in the region, and there are many smaller fur-bearing animals. Ptarmigan are seen above timber line and grouse in the lowlands. The Tanana flats are breeding grounds for geese, ducks, and other water fowl. Salmon do not reach the region, but grayling, or arctic trout, are abundant in the clear-water streams, and the lakes contain a species of whitefish.

GEOLOGY.

Sedimentary and volcanic rocks.—The oldest rocks of this province are phyllites, impure limestones, mica schists, and gneissoid granites such as make up the highlands north of the Tanana lowland. The

metamorphic series is to be correlated with the Birch Creek schist of the Yukon-Tanana region, believed to be of Cambrian or pre-Cambrian age. With these are associated some greenstone schists that are probably younger than the other crystalline rocks.

Overlying these are heavy conglomerates and slates that are probably of Devonian age. These rocks were found in a series of isolated hills that rise out of the gravel flat connecting the upper Tanana lowland with the middle White River valley. The north front of the Wrangell Mountains is made up of slates, volcanic rocks, and massive limestones that contain Carboniferous fossils. The relation of these to the conglomerates and slates (Devonian) above described has not been determined, as the two series are 30 or 40 miles apart.

A profound fault is believed to separate these Carboniferous rocks from the formations that make up the Nutzotin Mountains, which are composed of slates and graywackes, with some beds of fine conglomerate and a little limestone. These rocks are of Mesozoic age, probably chiefly Lower Cretaceous and Jurassic, but include some Triassic limestones and slates. They probably also occur above the Carboniferous on the Wrangell Mountains but have not there been definitely recognized. The most abundant Tertiary formation is the great complex of lavas that makes up the Wrangell Mountains, whose northern margin reaches into the district here discussed. Some sandstones have been found in the Tanana Valley below the Nabesna, and these are probably Tertiary. These sandstones have not been found in the region here discussed, but coal has been found in the upper White River basin near the international boundary and is probably of Tertiary age; the Tanana lowland may perhaps be carved out of rocks of this formation.

Igneous intrusives.—Igneous intrusives are not uncommon in the region. Most of those occurring in the larger masses are dioritic. Some are granitic. Rocks that have a general lithologic similarity to these but are porphyritic in texture also occur in dikes throughout much of the region. These intrusives are widely distributed and probably belong to one general period of intrusion, which is believed to be Mesozoic. In addition to these there are probably older granitic intrusives, now represented by gneissic rock, in the region lying north of the Tanana lowland. Diabase dikes also occur in some parts of the area and are probably of Tertiary age.

Structure.—All the terranes described above have a general northwest-southeast strike. The metamorphic rocks have been intensely squeezed and sheared, their planes of foliation dipping generally to the north. It is probable that the structure of the Nutzotin Moun-

tains is synclinal, as older rocks are found both north and south of the range. The detailed structure of these mountains is, however, complex, and both strikes and dips vary from place to place. It has already been noted that the Nutzotin Mountains and Wrangell Mountains are probably separated by a profound fault. On the southwest side of this fault the rocks usually dip to southwest, and the evidence in hand indicates that the structure of the Wrangell Mountains also is synclinal.

Unconsolidated deposits.—All the larger river valleys are deeply filled with silts, sands, and gravels. This blanket of unconsolidated material extends in some places far up the hill slopes. On White River, for example, it occurs 600 feet above the valley bottom, and it is found on the divides between White and Chisana rivers 1,200 feet above the valley bottoms.

Most of the material is directly or indirectly the result of glacial action. The larger rivers and many of the small streams head in glaciers, which are continually contributing débris that is carried away by the streams and deposited below. These glaciers formerly extended farther down the valleys than they do now. White River valley was once filled with ice far below the international boundary, and the valleys of the Chisana and Nabesna were filled to the northern front of the Nutzotin Mountains. Gravels and sands were deposited along the margins of these glaciers, and finer material was deposited in front, as outwash deposits, especially during the recession of the ice, which was accompanied by flooding of the water courses. In addition to these water-laid deposits, ice-borne material also was laid down by glaciers and is now found in some localities in the form of bowlder clay. Most of the unconsolidated material of the district is therefore directly or indirectly of glacial origin. The possibility of finding preglacial gravels is considered under the discussion of placers (p. 317).

A deposit of white tuff that occurs immediately underneath the soil is one of the most striking formations of the district. It is found in huge drifts in the Copper-White River basin and as a white bed in other parts of the area. This is part of an eruption of a volcano whose ejecta fell over an area of more than 20,000 square miles in the upper Yukon basin. According to Thomas Riggs, jr., engineer of the International Boundary Commission, the source of this tuff is a small crater near the international boundary, not far from the front of St. Elias Range.

Heavy beds of peat occur in the upper White River basin. In one section several beds of peat were observed separated by layers of fine sand or silt.

GOLD DEPOSITS.

History of discovery.—The exploration of the Tanana in 1898 led the writer to form the opinion that the metamorphic rocks north of the lowland had been mineralized, as indicated by the following quotation: [1]

> Near the mouth of Scottie Creek, on the Tanana, is an exposure of impure limestone schist and mica schist. The rock has been much deformed, and quartz veins are numerous. The mineral-bearing solutions have been injected in a zone of shearing some 30 feet wide, in which lie numerous mineralized quartz veins. Copper and iron pyrite were observed, and probably some galena. In a specimen of the calcareous schist taken from close to the shear zone, but not forming part of it, I found some grains of gold which had evidently been brought in by the penetrating solution. The gold occurs in the unaltered rock and was not associated with any extraneous matter.
>
> At another locality, about 15 miles below the mouth of the Robertson River, on the north side of the Tanana, a mineralized shear zone was found in the granite. This zone was not over 10 feet wide, and the granite along it had been brecciated rather than deformed. In this zone pyrite was observed and a few fine particles of gold.

During the hurried traverse of the Nutzotin Mountains made in the following year indications of some local auriferous mineralization were seen, but no very encouraging evidence of the presence of gold was found. It remained for Schrader in 1902 to offer more definite proof of the presence of auriferous quartz. His report is quoted as follows: [2]

> On the Chisana no gold was found above the Nutzotin Mountains. The Mesozoic rocks of the Nutzotin Range, however, consisting of slates, schists, greywackes, shales, limestones, and conglomerates, beyond doubt contain some gold. In these rocks one would expect the quartz, which occurs either as veinlets or stringers along the bights of folds or in the crushed material along faults and shear zones, to be the most favorable place to look for gold. An assay of a sample of quartz collected in a shear zone at the head of the canyon on the west side of the river gave a trace of gold. From a similar occurrence of quartz and calcite in crumpled shistose limestone and slate on Mound Creek a specimen was collected for assay. The returns gave 0.03 ounce of gold and a trace of silver, a money value of 60 cents per ton.

When in 1908 Moffit and Knopf visited the region they found that some auriferous quartz veins had been located, and the results of their studies are summarized by them as follows: [3]

> From the descriptions given in the preceding pages, it will be apparent that a lode-quartz region of some promise has been discovered in the Nutzotin Mountains near the international boundary and that as yet it has been but imperfectly explored by the prospector. It has been shown that the intrusion of quartz diorite produced a number of contact-metamorphic bodies of copper sulphides, and the occurrence on Jacksina Creek suggests that the magma was also capable of effecting an auriferous mineralization. From the meager data at hand it is perhaps unsafe to venture on

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[1] Brooks, A. H., A reconnaissance in the White and Tanana river basins, Alaska, in 1898: U. S. Geol. Survey Twentieth Ann. Rept., pt. 7, pp. 486–487, 1900.

[2] Mendenhall, W. C., and Schrader, F. C., The mineral resources of the Mount Wrangell district, Alaska: U. S. Geol. Survey Prof. Paper 15, p. 45, 1903.

[3] Moffit, F. H., and Knopf, Adolph, Mineral resources of the Nabesna-White River district, Alaska, with a section on the Quaternary by S. R. Capps: U. S. Geol. Survey Bull. 417, p. 62, 1910.

generalizations, yet it is probable that the quartz veins are genetically related to the intrusion of the post-Carboniferous quartz diorites and that therefore the intruded areas are those most likely to be mineral bearing. Such areas are known to occur throughout the Nutzotin Mountains at a number of localities, especially along their northeastern flanks. Brooks has mapped a large area of granular intrusive on the lower Nabesna. It is probable that in the vicinity of such masses the search for lode quartz may be prosecuted with the most hope of success.

Though copper deposits have been known in this district since 1899 and gold since 1902 neither have been much developed. Assessment work has been kept up and some developments have been made on both copper and gold lode claims, but the inaccessibility of the region has discouraged all but a few miners. Probably not over an average of 25 men were in the entire region until the placer gold was discovered. Some search was made for gold placers and several prospects were found, but there was no productive mining. A number of years ago a little sluicing was done near the scene of the recent discovery, but without encouraging results.

William E. James and Peter Nelson are credited with having found the first workable placer. This discovery, which took place on May 3, 1913, was made on a creek called Bonanza by the prospectors, but more important was the find made on a small tributary of the stream named Little Eldorado. Gold was also found in the gravels of other near-by streams, but mining in 1913 was largely confined to Little Eldorado.

Geographic nomenclature.—In accordance with the prevailing practice, the prospectors in this district promptly applied new names to every watercourse on which claims were staked, giving no heed to the fact that 10 years before this influx of miners an official and accurate map of the district had been published on which every effort had been made to apply the correct Indian nomenclature to these streams. These authorized names were entirely ignored by the prospectors; Chatenda Creek became Johnson Creek, Chapolda Creek became Wilson Creek, and a new crop of Bonanza, Eldorado, Glacier, Coarse Gold, and Goldbottom creeks were started—names that have been used scores of times and that appear in every placer district of Alaska. It is unworthy of Alaska pioneers to substitute this commonplace terminology for the euphonious native names, and especially to persist in the foolish duplication of geographic place names. Concerted effort should be made by Alaskans to put a stop to this thoughtless practice, which leads to hopeless confusion.

Unfortunately these prospectors' names can not be ignored, for they are used in recording claims and thus form a part of the court records. Names of the watercourses have been changed by prospectors as follows: Chisana River to Shushana River, Gehoenda Creek to Trail Creek, Chatenda Creek to Johnson Creek, and Chapolda

Creek to Wilson Creek. Other names also have probably been changed, but of these there is as yet no record.

Placers.—Auriferous gravels have been found in an area about 5 by 8 miles square lying east of and tributary to the upper Chisana (Pl. XIV), but from what is known of the geology of the region there is no inherent reason why the gold-bearing area should be so limited. This area is drained by Chatenda (Johnson) and Chapolda (Wilson) creeks. The headwaters of these streams include rather broad open basins, but in their lower courses they flow through narrow, steep-walled canyons. Only their lower courses are timbered, their upper basins, where the actual mining has been done, being far above the limit of timber.

The bedrock of the district is chiefly closely folded gray and black shale with some intercalated beds of sandstone and conglomerate. Some of the shales are calcareous. Intrusive rocks occurring in dikes are abundant. These formations are similar to those that make up much of the Nutzotin Mountains and are presumably Mesozoic in age.

In view of the presence of auriferous quartz veins in the district there can be little doubt as to the source of the placer gold. One such mineralized quartz vein, which has long been known, lies close to the mouth of Bonanza Creek and therefore near the scene of the first gold discovery. The auriferous mineralization is doubtless connected with the intrusion of the igneous rocks (p. 312). The gravels that were mined in the summer of 1913 will not exceed 4 feet in depth and the pay streak on Little Eldorado is reported [1] to be about 100 feet wide. These shallow gravels are not moss covered and are therefore not permanently frozen.

During the summer of 1913 the Discovery claim, on Little Eldorado Creek, was opened and was the principal source of the gold output of the district. Some mining was also done on near-by claims, and placer gold was found on several other creeks in the Chatenda and Chapolda basins.[2] The total placer-gold production in 1913 is variously estimated, the values given ranging from $30,000 to $70,000.

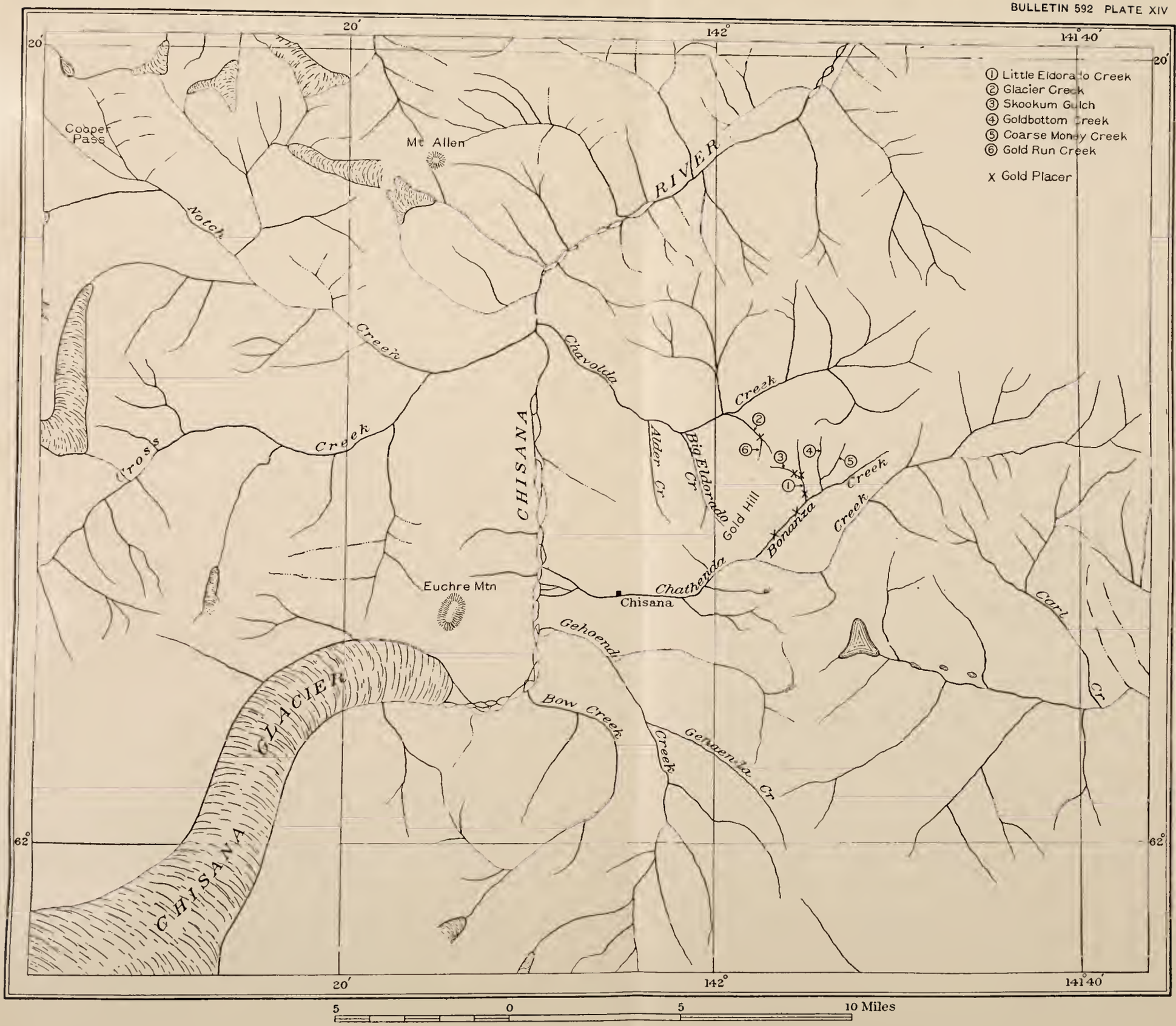
Cairnes [3] has described the character of the placer gold as follows:

> The gold itself from Chisana that has been assayed is worth about $16.10 per ounce, and is dark in color, having a peculiar almost bronzelike cast, due possibly to a slight coating of iron oxide. All that has so far been found is also quite coarse, practically no dust having been obtained. The greater amount of the gold is in particles ranging in value from 1 to 10 cents; but nuggets worth from $1 to $2 are common, and some have been found worth from $18 to $20, or even more. In shape, the gold

[1] Cairnes, D. D., Chisana gold fields: Canadian Min. Inst. Bull. 24, p. 61, 1914.

[2] Recent reports indicate that gold placers have been found on Big Skookam, Dahl, Rhyolite Canyon, Gold Run, Big Eldorado, and Dry creeks. A high gold tenor is reported in the gravels at a number of new localities, and the outlook for a fairly large gold output in 1914 seems favorable.

[3] Op. cit., p. 62.



SKETCH MAP OF THE CHISANA PLACER DISTRICT.

particles are dominantly flat, some being decidedly thin and flakelike, indicating apparently that the gold was prevailingly deposited originally either in narrow seams in the inclosing slate rock or along the contact between quartz veinlets and the inclosing rock formations.

Future of placer mining.—It will be evident that the shallow gravels, occupying narrow valley floors, can not contain any large amount of auriferous alluvium. The conditions adverse to mining are lack of timber and, in many of the creeks, scarcity of water, conditions that are partly offset by the absence of any overburden and the thawed condition of the gravels. The evidence in hand indicates that the richer placers can be mined at a profit in spite of the present high cost of operating. On the other hand, the discoveries thus far made have not revealed a sufficient bulk of material to assure a large placer camp. There are some deep gravels on Chapolda, Chatenda, and other creeks of this district, but these have not been prospected. Some attempts to reach bedrock during the winter of 1912–13 were said to be unsuccessful because flowing water was encountered, and if this is common underground mining is not likely to be feasible, and any gold in the deep gravels will have to be recovered by open cuts.

There are some gravel-covered benches in this district, said to carry gold, but they have not been sufficiently opened up to test their value. In its general features this district is comparable to the Chistochina, which has produced about $1,700,000 worth of gold since mining began, in 1899.

The evidence in hand indicates that mineralization in the district is widespread, and placer prospects have been found both northwest and southeast of the scene of the actual mining. Now that the prospectors are in this field other discoveries can be expected, and there is no reason to believe that auriferous gravels may not occur in other parts of the region.

The fact that the region adjacent to the discovery is glaciated is unfavorable for the occurrence of large bodies of workable placers. The glaciers have swept away and dissipated nearly all the accumulations of preglacial auriferous gravels, and since the period of glacial action the time has not been long enough to permit any large accumulations. Some preglacial channels may, however, be preserved, and these would seem to be the best sites for extensive placer deposits. The presence or absence of such channels can be established only by detailed prospecting.

The northern fronts of the glaciers that occupied the Chisana Valley reached only the north margin of the Tanana lowland. This can therefore be considered the approximate northern limit of glaciation, beyond which the preglacial gravels have not been disturbed by ice action. Ice erosion gradually decreased toward the

limit of glaciation, so that prospectors approaching this area from the south should find increasing possibility of discovering undisturbed preglacial gravels until they reach the line of the old ice front.

Another field worthy of investigation for placer gold and adjacent to the scene of the discovery is the highlands north of the Tanana lowlands. This includes the basins of Scottie, Gardiner, and other creeks flowing from the north. Here, so far as known, the rock formations are in part the same as those of the placer camps of the Yukon-Tanana region. Moreover, as already pointed out (p. 314), evidence of auriferous mineralization has been observed in this field. A few prospectors have roamed over this region, but most of them have been without sufficient supplies to permit them to test the gravels thoroughly, though colors of gold have been found. The gravels in this area are probably deep, how deep no one can foretell. It may become necessary to sink prospecting shafts, which in a region so remote from transportation routes will be expensive. If there are gold deposits here they are probably associated with intrusive granites or diorites, as in other parts of the Yukon-Tanana region, and the prospector should therefore seek such granite intrusives and, finding them, give special attention to streams that flow across the contacts of the igneous rocks and the schists in which these rocks have been injected.

COPPER.

It is not the purpose of this report to discuss in detail the copper deposits of the region, which have been fully described in the publications already cited. The placer copper of the upper White River has long been known and utilized by the natives. It was first visited by white men in 1891, when C. W. Hayes, then of the Geological Survey, made a brief examination of the occurrence.[1] In 1899 copper was first found in bedrock.[2] Since that time many copper-bearing lodes have been found and some developments made. No productive copper mining can be expected till railroad communication with the coast is established.

The copper occurs (1) in association with ancient volcanics and (2) in contact-metamorphic limestones and intrusive diorites. Both classes of rocks are typically developed along the northern flank of the Wrangell Mountains and are presumably of Carboniferous age. The copper-bearing minerals are sulphides and native copper. Native copper occurs both as a primary constituent of amygdaloidal lava and as a secondary oxidation product of sulphides.

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[1] Hayes, C. W., An expedition through the Yukon district: Nat. Geog. Mag., vol. 4, pp. 117–162, 1892.

[2] Brooks A. H., A reconnaissance from Pyramid Harbor to Eagle City, Alaska: U. S. Geol. Survey Twenty-first Ann. Rept., pt. 2, pp. 380–381, 1900.

MEANS OF COMMUNICATION.

The Chisana placer district may be approached by feasible routes of travel from nearly every direction. The shortest route from an established transportation system leads from McCarthy, a station on the Copper River & Northwestern Railway, 191 miles from Cordova, over the ice-covered Skolai Pass to White River and thence across a second divide to the Chisana. This distance is about 100 miles. The journey necessitates crossing the Russell Glacier, a passage involving both difficulty and danger. It is available, however, for horses. Another route that has been used extends through the Wrangell Mountains by way of Nizina and Chisana glaciers. By this route the distance from McCarthy to Chisana is about 80 miles. It involves crossing glacial ice for some 40 miles, as well as a divide some 11,000 feet high, and is not available for horses. Glacial ice can be entirely avoided by the Valdez or Chitina route, which leaves the railroad at Chitina, 131 miles from Cordova, or the coast at Valdez, and follows a wagon road to Gulkana, 80 miles from Chitina and 128 miles from Valdez. From Gulkana it follows a horse trail to Batzulnetas, near the head of Copper River, thence crosses a divide to Nabesna River and a second divide to the Chisana. The distance from Gulkana to Chisana by this route is about 140 miles, making a total of about 220 miles to Chitina and 268 miles to Valdez.

Small steamers have ascended the Tanana as far as the mouth of the Nabesna, but navigation is difficult, as the current is swift and there are many bars and snags. At low water navigation may not be feasible. The mouth of the Nabesna is about 250 miles by river from Fairbanks and 70 miles by trail from the Chisana district. The old mail trail which leads from Eagle on the Yukon to Tanana Crossing can also be used. By this trail it is about 150 miles to Tanana Crossing and thence about 90 miles to the Chisana district.

There are also two principal routes of access from Canadian territory. A wagon road leads from Whitehorse—the end of the railroad on the White Pass & Yukon Route, 110 miles from Skagway—to Lake Kluane, the distance being 143 miles. Thence there is a trail to Chisana by way of White River, the distance being about 225 miles. The White River route is described by Cairnes [1] as follows:

> The White River route follows up White River from its mouth to Beaver Creek, a distance which is generally considered to be about 115 miles but which according to a survey of the river made by W. J. Peters in 1898 is only 85 miles. Ordinary light-draft steam and gasoline river boats may be navigated for about 60 to 70 miles up White River, or to about the mouth of Donjek River; and one small specially designed gasoline boat succeeded in reaching the mouth of Beaver Creek [also called Snag

[1] Cairnes, D. D., Chisana gold fields: Canadian Min. Inst. Bull. 24, 1914.

River] and is reported to have made the passage from the mouth of the White to Beaver Creek in four days. Poling boats have in the past been mainly utilized on White River from the mouth up, and last season were in use especially above the mouth of Donjek River, or above the different points at which the power boats were inoperative. It is claimed also that it is quite possible to take poling boats a considerable distance up Beaver Creek.

INDUSTRIAL CONDITIONS.

The news of the finding of placer gold in the Chisana district was quickly disseminated and widely advertised by those who expected to reap a profit directly or indirectly from the expected gold seekers. It came at a time when placer mining was at a rather low ebb in many of the older districts and thus found many who were anxious to find a new field of activity. As a consequence several thousand gold seekers, both from Alaska and from outside of the Territory, started for the scene of discovery, and as the various routes presented no serious physical obstacles to travel, most of these reached their destination. Many were but ill equipped for a sojourn in a region so distant from points of supply and almost at once had to turn back for lack of provisions. There was the usual disappointment, for long before the main mass of stampeders had reached the new diggings every creek in the district had been covered with claim locations. The recent change in the placer mining law, however, prevented the wholesale preemption of the entire district by a few persons, a practice so frequent under the old statute.

Nearly 100 cabins were built on lower Chatenda (Johnson) Creek, forming "Chisana City," which became the distributing point for the district. It is stated that about 300 men wintered in the district. As has already been stated, the gravels do not seem to be favorable to underground mining, hence probably no great amount of prospecting was accomplished in the winter. The coming summer will undoubtedly witness more thorough prospecting of the known placers and a further search for other gold-bearing areas.

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